



A 1 year comparison of a Community Based Exercise Program versus a Day-Hospital based exercise program on Quality of Life and Mental Health in Severely Burned Children

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Abstract

Objective—To compare the effects of long term psychosocial functioning and mental health of a “Day-Hospital” Based Exercise Program (DAYEX) versus a Community Based Exercise Program (COMBEX).

Design—This was a prospective design that consisted of two groups (DAYEX and COMBEX).

Setting—A children’s hospital specialized in burn care (Shriner’s Hospitals for Children, Inc., Galveston, Texas)

Participants—A total of 18 patients, (n=9 DAYEX and n=9 COMBEX) were assessed at Intensive Care Unit (ICU) discharge and up to 1 year post burn.

Intervention—The Child Health Questionnaires (CHQ-Child/CF87 and Parent/PF28) were used to assess changes in quality of life from discharge to 1 year post-burn.

Main Outcome Measures—CHQ-PF28 and CHQ-CF87

Results—Demographic and TBSA were similar in both groups. Length of hospital stay was significant in the COMBEX group. CHQ-CF87 and CHQ-PF28 document significant improvements in both groups between discharge and 1 year. Significance was evident in Physical

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We (the authors of this manuscript) have nothing to disclose

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This study was registered in clinicaltrials.gov (#NCT00675714)

Functioning, Bodily Pain, Self Esteem, Change in Health, and Family Activities. CHQ-CF87 showed improvement in Family Cohesion in COMBEX more than DAYEX. CHQ-PF28 showed improvement in Role/Social Limitations - Emotional, Bodily Pain, and Family Activities in COMBEX more than DAYEX.

Conclusions—The proposed COMBEX program shows to be feasible and beneficial physically, psychosocially, and mentally. The results show some improvements in the COMBEX group in optimizing function and health in severely burned children. The COMBEX group performed at least as well as the DAYEX group. Larger scale studies are needed to validate current findings.

Keywords

Exercise; Psychosocial; Burns; Children; Physical; Mental

Introduction

An exercise program conducted in a hospital setting is associated with numerous health benefits in severely burned children and adolescents. [1–3] Benefits include increased muscle mass, strength and cardio-pulmonary function. [1–3] We reported that children who were in a 12-week “Day-Hospital”–Based Exercise Program (DAYEX) positively affected physical and mental health outcomes and children who were in 12-week Community Based Exercise Program (COMBEX) increased lean body mass, strength, and cardio-pulmonary function. [1–3] [3, 4] [5] A 12 week exercise program improves the psychological status, quality of life and work capacity in hemodialysis patients.[6] A preliminary study shows the positive impact of a short exercise program in improving the physical health and positive well-being of prostate cancer survivors. [7] Providing an exercise intervention in a community where cancer survivors live, can improve physical, psychological and social functioning outcomes. [8] [9]

Previous studies of the research group evaluated outcomes directly after the exercise programs and present study evaluates long term outcomes within 1 year from the date of burn of those who were enrolled in an exercise program. Little is known about the long-term effects of COMBEX (near-home) program on mental health in severely burned children. We hypothesized that emotional outcome would be improved for patients participating in the COMBEX program 1 year post burn and that patients participating in the COMBEX program would have better psychosocial outcomes than DAYEX program participants. This is because they were at home with extended family support.

1. Methods

1.1 Design and Participants

This prospective, randomized study was approved by the Institutional Review Board at the University of Texas Medical Branch (Galveston, Texas). This study consisted of two groups: children that participated in COMBEX or DAYEX and was designed as a long term outcome study.

A total of 18 children aged 7 to <18 years who had 30% total body surface area (TBSA) burns, who were previously enrolled and randomized to one of the two exercise programs, and whose parent/guardian participated in the study.

1.2 Procedure

Data collection procedures were similar across this study and involved identification of eligible patients through clinic database at Shriners Hospitals for Children—Galveston.

Inclusion Criteria—Inclusion criteria included a 30% TBSA burn, age of 7 to 18 years, absence of acute illness or hospitalization, attendance at the follow-up clinic, negative pregnancy test, informed consent, and able to read and speak English or Spanish.

Exclusion Criteria—Exclusion criteria included untreated malignancy; known history of AIDS, ARC, HIV; recent history of myocardial infarction; endocrine diseases; diabetes mellitus prior to burn injury; renal insufficiency (defined by creatinine >3.0 mg/dl), and hepatic disease (bilirubin > 3.0 mg/dl).

1.3 Instrument

The Child Health Questionnaire (CHQ) is a family of generic quality of life (QOL) instruments that were developed by Landgraf et al. in 1996 [10] as a reliable and valid QOL measure for children aged 5–18 years. [11] The CHQ is a family of general pediatric quality of life surveys that have been designed and normed for children from 5-to-18 years of age. The child self-reported version of the CHQ consists of 87 items (CHQ-CF87) and was developed for completion by children from ages 10 and older. The CHQ includes scales that consider the effects of children's health on family functioning and specific scales, such as behavior and self-esteem. [12] The CHQ measures 14 unique physical and psychosocial concepts and is available in multiple languages; English and Spanish were used for this study.[10] Questionnaires were self-completed by the outpatients and/or parents at discharge and 9–12 month post burn and were distributed from December 2007 to December 2014. The CHQ for both Parent (PF 28) and Child (CF 87) were used to assess QOL and mental health status in severely burned children participating in the COMBEX and DAYEX programs. These questionnaires were provided at discharge from the acute unit and at the 9–12 month post-burn follow-up appointment. Both groups were at home for an additional 20–30 weeks after discharge, before the questionnaire was administered.

The families were instructed for the child to fill out their own questionnaire. The short parent– report questionnaire (CHQ-PF28) includes 28 items and assesses children's physical, emotional, and social well-being from the perspective of a parent or guardian [13]. The child self-report questionnaire (CHQ-CF87) includes 87 items and assesses children's physical, emotional, and social well-being from the child's perspective for children 10 years and older [11, 12].

The instrument refers to the last 14 days and includes eight different categories of activities (dressing, eating, walking, getting up, reaching, gripping, hygiene and activity). All participants in both DAYEX and COMBEX groups and their parent/guardian filled out the

instrument when participants were discharged from the acute unit of the hospital. Each question is scored from 0 to 3 (0= no difficulty, 1= some difficulty, 2= much difficulty, 3= unable to complete task). The total score varies from 0 (no limitation) to 3 (extensive limitation). [10]

Scoring of the CHQ (PF 28 and CF 87) followed guidelines provided in the manual. [10] Raw scores were then converted to scaled scores (0–100). Higher scores indicated better health and QOL.[10]

1.4 Data Analysis

For each of the child or parent concept outcomes, 1) a two-sample Welch's t-test compared the baseline values between treatment groups (DAYEX versus COMBEX) at discharge, 2) a paired t-test assessed the change in the DAYEX group between discharge and 1 year time points, 3) a paired t-test assessed the change in the COMBEX group between discharge and 1 year time points, and 4) a two-sample Welch's t-test compared the change from discharge to 1 year time points between the DAYEX group and COMBEX group. Hommel-adjusted p-values controlled for multiple tests per outcome. Statistical analyses were performed using R statistical software [21]. In all statistical tests, $\alpha=.05$. Additionally, each child or parent concept outcome was dichotomized per the improvement status (improved if the score increased between discharge and 1 year), and differences between treatment groups per counts improved were assessed by chi-square tests.

2. Results

Eighteen children were randomized to DAYEX or COMBEX (consort flow diagram). Six males and 3 females were in the DAYEX group, and 7 males and 2 females were in the COMBEX group. Physical characteristics of age, height, weight, length of stay, TBSA burned, percent third-degree burned and medications were similar between groups ($P > 0.05$; Table 1). In addition to exercise, patients received medications to improve metabolism (Table 1). Medications did not statistically differ between the exercise groups. Significance in the Length of hospital Stay (LOS) was observed because 5 participants in the COMBEX group stayed in hospital for more than 45 days (Table 1).

For the incidence of improvement results, parents' perspective showed significantly more improvement in Role/Social Limitations – Emotional (REB), Bodily Pain (BP), and Family Activities (FA) in the COMBEX group than the DAYEX group. (Figure 1) Children's perspective showed significantly more improvement in Family Cohesion (FC) in the COMBEX group than the DAYEX group. (Figure 2) Between-group comparison showed similar improvements in all psychosocial and physical domains for both CHQ-PF28/CF87 questionnaires and detected no statistically significant differences between groups. (Tables 2 and 3)

Overall, there was no evidence for a difference between groups at baseline (discharge), nor was there any evidence for a difference between groups in change over time from baseline. For Physical Functioning (PF), both the DAYEX and COMBEX groups showed significant improvement from baseline per both children and parents' perspective. For Bodily Pain

(BP), children showed significant improvements from baseline in both DAYEX and COMBEX groups, but parents' perspective only showed a significant improvement for the COMBEX group. For Self Esteem (SE) children showed a significant improvement from baseline for the COMBEX group, but no significant improvement for DAYEX, and nothing for either group per the parents' perspective. For Change in Health (CH), children showed a significant improvement for the DAYEX group, but no significant improvement for COMBEX, and parents reported significant improvements for both DAYEX and COMBEX groups (of note, the improvements in CH were very small for both children and parents). For Family Activities (FA), parents reported significant improvements from baseline for the COMBEX group, but no evidence of improvements in the DAYEX group, and children did not show evidence of significant improvement. (Figures 3 and 4/Tables 2 and 3)

3. Discussion

We compared the long-term effects of COMBEX near their home and DAYEX on mental health in severely burned children. Our first hypothesis that emotional outcome would improve in COMBEX because of availability of extended family support was not proven. Both groups reported improvements in QOL at discharge and 1 year post burn. This might be because both groups received family support. DAYEX patients stayed at the hospital with a caretaker and COMBEX patients were close to family and friends in their communities.

We also hypothesized that COMBEX patients would have a better psychosocial outcome than DAYEX patients, given that they were at home with extended family support. We expected significantly greater improvement in COMBEX patients because they were close to home and because it may have had a positive impact on self-concept and social skills. This hypothesis was also not proven, and this might also be related to the fact that both groups had family support. Please keep in mind that the DAYEX patients also returned to their permanent home but assistance for continued exercise within their community was not provided and therefore the patients in this group did not continue exercising when they returned home. Also, it was expected that this group would improve less than the COMBEX group because they didn't have this extracurricular activity that would distract them from the stressors of being home. This study demonstrated that both a professionally supervised DAYEX and a COMBEX Program consisting of progressive strength training and cardiovascular or aerobic activities are safe and associated with improved physical function, strength, and mobility, as indicated by improvements in mental health and QOL. [1, 3, 4] These results are consistent with findings from a recent prospective review of 34 randomized exercise trials in severely burned children, which found that DAYEX and COMBEX were equally effective in improving strength, cardiopulmonary function, and lean body mass. [3]

Routine Standard of Care (SOC), which includes physical and occupational therapy, was given to severely burned children in the COMBEX group while they were in the hospital. The COMBEX group also received 3 months of exercise at an at home gym. [3]

These instructions included attendance for 12 weeks, 3 times a week for 36 sessions under the supervision and guidance of a personal trainer. The personal trainer was also faxed or

emailed a workout routine that consisted of aerobic and resistive exercise. Recommendations included a warm-up phase, exercise training phase, and cool-down phase (Table 4).

As part of the resistive exercise routine, variable resistance machines and free weights were recommended (Table 4). [3] Training was progressive with increasing weight to continue to derive additional strength gains and possibly, to prevent the long-term loss of previous strength gains. Exercise prescription, was structured to fit an individual patient's current goals and responsive to changes over time.

The "talk test" [14] was used as a measure of exercise intensity. Exercise sessions included a warm-up and cool-down phase in the COMBEX exercise routine (Table 4).

In the COMBEX group, compliance with the gym was assessed via a self-report exercise diary. Both participants and personal trainers had to keep track of attendance; the type, frequency, intensity, and duration of exercise, and perceived exertion. These records were collected by the hospital exercise center at the follow-up appointment after the 3-month gym membership had ended.

Once discharged, DAYEX participants were accommodated at a hotel or housing near the hospital. They were outpatients living in these homes for 3 months before being released to their permanent residence.

During these 3 months, DAYEX participants were scheduled for clinical appointments, which included supervised DAYEX sessions.

Clinical appointments included physical and occupational therapy sessions, both of which are routine SOC for all severely burned children. These rehabilitation sessions (physical therapy and occupational therapy) typically lasted 1–2 hours/day, 5 days/week. Once done with the 12-week in-hospital rehabilitation session, DAYEX participants were given written instructions for doing these activities at home. [15, 16]

The DAYEX group also received aerobic and resistive exercise sessions as described by our group. [1, 3, 17, 18] These sessions lasted 12 weeks long, were done in the hospital gym, and consisted of progressive resistive and aerobic exercise (Table 4). Personal Trainers at the in-hospital gym ensured aerobic exercises were performed according to the American College of Sports Medicine training guidelines. [19]

Exercise sessions were done at 60–85% of the peak heart rate attained during a peak exercise treadmill test, but also using perceived exertion of moderate using the Borg Scale (1–10). [20] Attendance and type and frequency of exercise were documented by hospital gym staff. Once discharged from the acute unit in the hospital, patients in both DAYEX and COMBEX groups are assigned housing near the hospital. Since most of the patients are from Mexico and frequent follow-ups and therapy are required, these patients cannot return to their permanent home until they are discharged from all SOC treatments. They are completely discharged and ready to go to their permanent home 2–3 months after discharge.

Many factors may underlie the significant decrease in Family Cohesion within the DAYEX group. Past research has shown that solid family cohesion, characterized by the feeling of

affective association or union within the family [22], may serve as a buffer to psychosocial stressors. [23]

Even when relatives show the satisfaction gained when caring for their severely burned child, this care can be overwhelming both mentally and physically and can create tension in relationships. Consequently, all family members, including the patient, confront significant adjustments in their situation that require adapting to different caring viewpoints (inner and outer) for their burned child. [24] The lives of family members may become interrupted both socially and physically, affecting their QOL. [25, 26]

When burned children go home, they fear the responses they will receive from their family members. Many must deal with stares and/or hesitance of family members touching them due to fear of harming them. [25, 27, 28]

Parents' perceptions of the functional health status of their children were the same as the children's perceptions. The concordance of parent and child in assessing the progress of adolescent burn survivors revealed similar outcome estimates of recovery following burn injury.[29]

The results of this study are similar to other studies on physical activity and QOL. Physical activity is associated with improved global health-related QOL in cancer survivors.[30, 31] Aerobic and resistance training improves many components of QOL in indigenous Polynesian people with Type 2 Diabetes Mellitus. [32] A short elliptical exercise training program improves fatigue and QOL ratings in multiple sclerosis patients. [33] Recently, a 24-week combined exercise program was shown to improve muscle strength of the knee extensors and flexors emphasized in the hamstrings of multiple sclerosis patients. [34] Several studies have shown home exercise programs to be effective in the short-term treatment of heart failure. [35, 36]

4. Limitations

The main limitation of our study is the long time between the exercise program and the measurements. Another limitation of our study was its small size and low power. Because of this factor, we were unable to perform statistical analysis and sub analysis by drug administration. Small size in the study was also due to patients difficulty meeting their time points because most of these patients came from Mexico and had difficulty with: obtaining immigration visa, obtaining transportation, returning questionnaires to the psychology department as requested before departing to Mexico and being reached via phone. This factor also explains the long time lapse between exercise and measurements. Many of patients would miss time points due to this reason. The questionnaires given were self-administered and because of this we (research team) had no control over patient/parent (guardian) interpretation and there were uncertainties about who filled out the questionnaire (Parent or child).

Compliance with CHQ was challenging. Some COMBEX patients could not keep clinical/ research appointments at Shriners Hospitals for Children (Galveston) at different time points. Attempts were made to call patient and their caretaker to complete questionnaires

over the phone, but most families did not have a phone or the number on file was a non-working number.

However, DAYEX patients more likely to keep their exercise appointment because they were housed in apartments near or behind the hospital and were transported (hospital shuttle) to the hospital every day for follow-up appointments (including exercise). For both groups, patients were more likely to return for short-term follow-up appointments (3 and 6 months) than long-term follow-ups (9 and 12 months).

Compliance with exercise was difficult for some. Five patients randomized to the COMBEX group declined to continue participation in the program due to having multiple surgeries. Three of these 5 patients also mentioned that exercising at a community gym was challenging because they felt embarrassed to exercise in public owing to their burn scars. Two subjects in the COMBEX group had low compliance with exercise due to missed appointments because of multiple surgeries and inconsistency assisting the gym. (Figure 5)

Fourteen patients randomized to the DAYEX group did not keep their exercise appointments due to surgeries scheduled, recovery from surgery, and instructions from the surgeon not to exercise. Studies show a consistent positive association between more intrinsic motives and exercise. [37] Intrinsic motivators are characteristics within the patient that inhibit or enhance the patient's desire to exercise.

Some patients reported difficulty getting to the nearest gym, which was far from their home. Proximity to home is a very important determinant of a patient's ability to engage in exercise. Ensuring that the exercise facility is a place where the patient feels comfortable performing the exercise routine is also important.

The most significant social support factor/psychosocial adjustment factor for burn-injured children appears to be family support. [5] The Trainer-Patient relationship can influence the patient's loyalty to the trainer, their perception of barriers to improvement, and their desire for feedback. The patient's other social relationships can modify their enjoyment of exercising and perception of social supports in the process of getting better. Finally, how exercises are presented to the patient can have a large impact on their continuing level of motivation.

The first and probably biggest disadvantage to joining a community gym is cost (Table 5). The usual price for gym membership (3-month), personal trainer, and transportation in the U.S. and Mexico is between one and two thousand dollars, possibly more. Cost of vehicle fuel for traveling greater distances can increase this figure. U.S. residents who have health insurance coverage for their children may be able to counter this cost; however, few gyms accept insurance and if they do, only a small percent of the cost is covered. This percentage excludes personal training. For Mexican residents, no financial aid is available for gym expenses and transportation. DAYEX participants did not pay to use the hospital gym. Shriners Hospitals for Children is a non-profit organization, and in-hospital care to severely burned children is funded through donations and sponsorships.

5. Conclusion

Our data confirms that COMBEX and DAYEX are not only feasible, but also effective for severely burned children. Such programs improve functional capacity and health-related QOL and should be considered in the routine management of these patients. Burns can leave a pediatric patient with severely debilitating and deforming contractures, which can lead to significant disability when untreated. The most effective delivery method that meets burn survivors needs, interests, and exercise safety concerns remains unknown. Therefore, burn rehabilitation is not to be undertaken by individuals, but should involve a multidisciplinary team so that every aspect of the child's physical, psychological, and social needs is met during hospitalization and following discharge. In the future, uniform guidelines should be established to ensure that the COMBEX program for severely burned children is scientifically rigorous and cost-effective. We will also use a larger-scale to validate the current findings in this study.

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List of abbreviations

COMBEX	Community Based Exercise Program
DAYEX	“Day-Hospital” Based Exercise Program
IRB	Institutional Review Board
TBSA	Total Body Surface Area
AIDS	Acquired Immune Deficiency Syndrome
ARC	AIDS Related Complex
HIV	Human Immunodeficiency Virus
CHQ	Child Health Questionnaire
CF	Child Form
PF	Parent Form/Physical Functioning
PT	Physical Therapy

OT	Occupational Therapy
ACSM	American College of Sports Medicine
LOS	Length of Hospital Stay
CH	Change in Health
REB	Role/Social Limitations – Emotional/Behavioral
RP	Role/Social Limitations – Physical
BP	Bodily Pain/Discomfort
PE	Parental Impact – Emotional
PT	Parental Impact – Time
FA	Family Activities
GGH	Global Health
GH	General Health Perceptions
FC	Family Cohesion
RE	Role/Social Limitations – Emotional
MH	Mental Health
SE	Self Esteem
BE	Behavior
GBE	Global Behavior
QOL	Quality of Life
MS	Multiple Sclerosis

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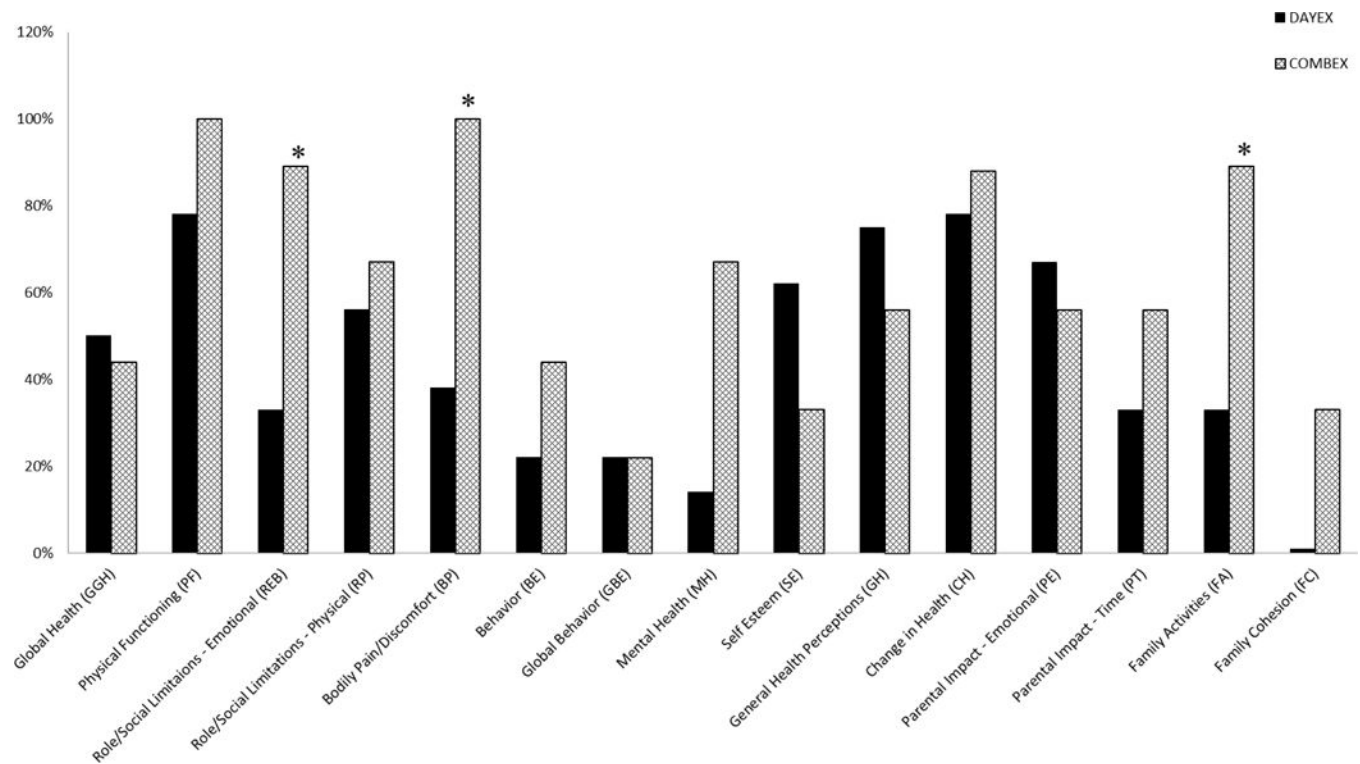


Figure 1. Child Health Questionnaire (CHQ) Parent Perspective Overall Percent of Subjects who Improved by Item between groups

* Parents perspective of the CHQ showed significant improvement in Role/Social Limitations - Emotional (REB), Bodily Pain (BP), and Family Activities (FA) in the COMBEX group more than the DAYEX group

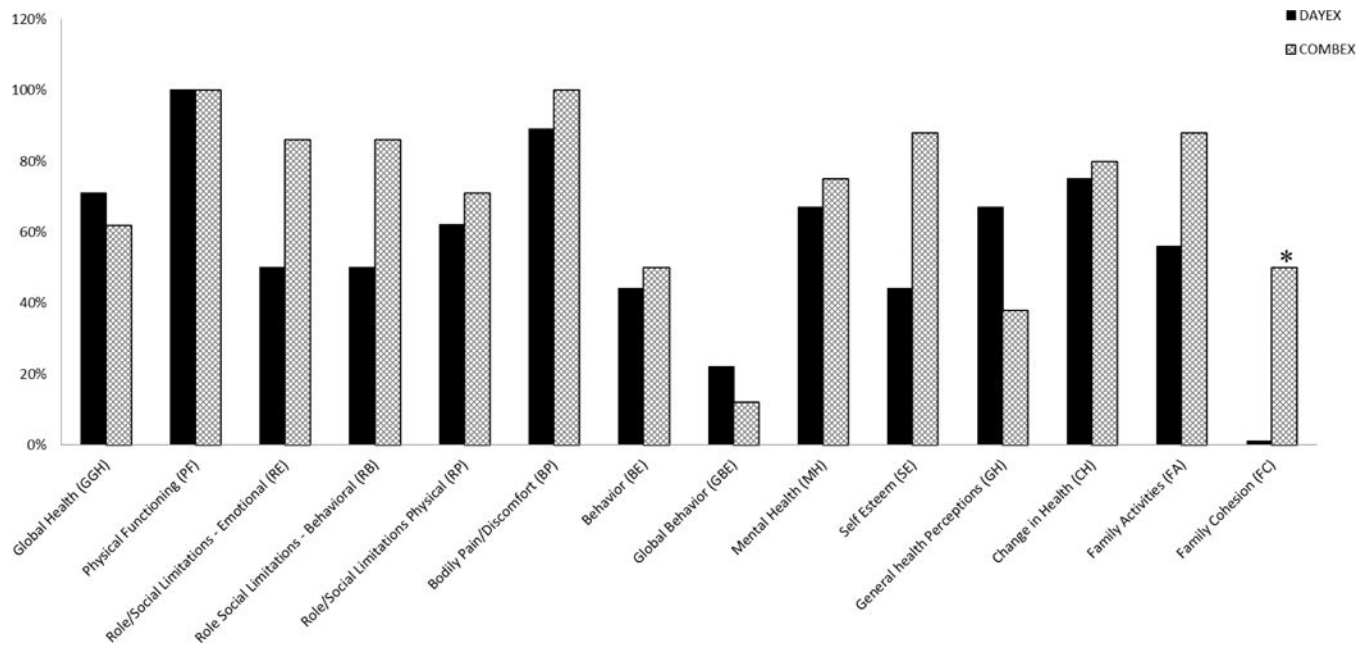


Figure 2. Child Health Questionnaire (CHQ) Child Perspective Overall Percent of Subjects who Improved by Item between groups

* Child perspective of the CHQ showed significant improvement in Family Cohesion (FC) in the COMBEX group more than the DAYEX group

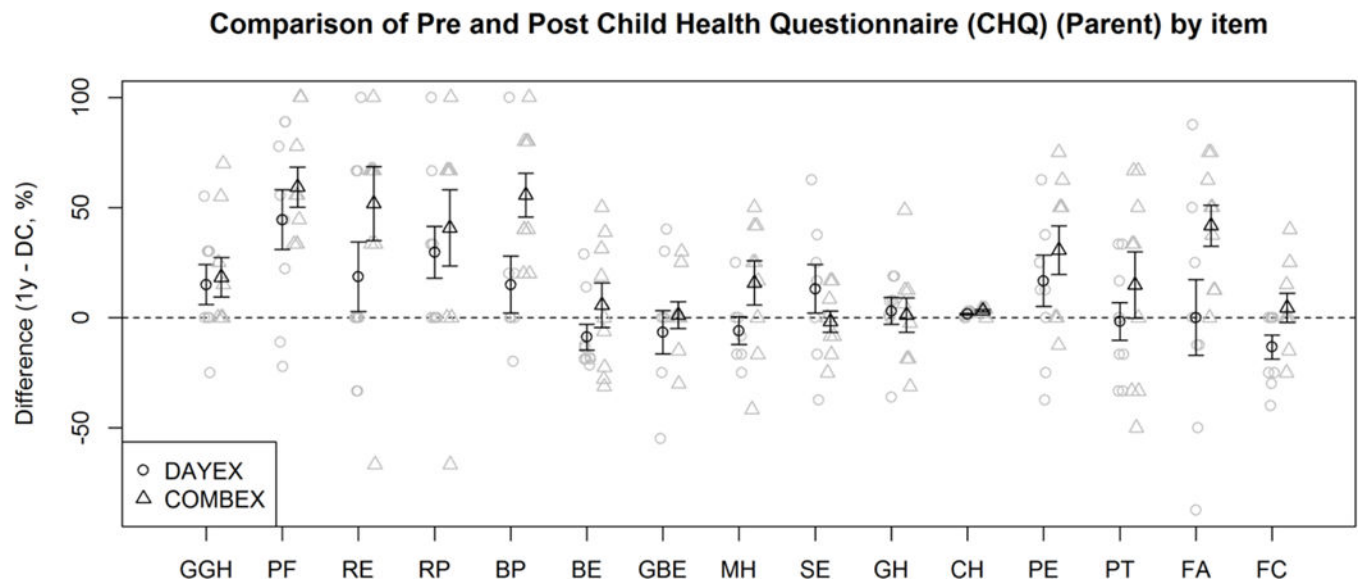


Figure 3.
Comparison of Pre and Post Child Health Questionnaire (Parent)

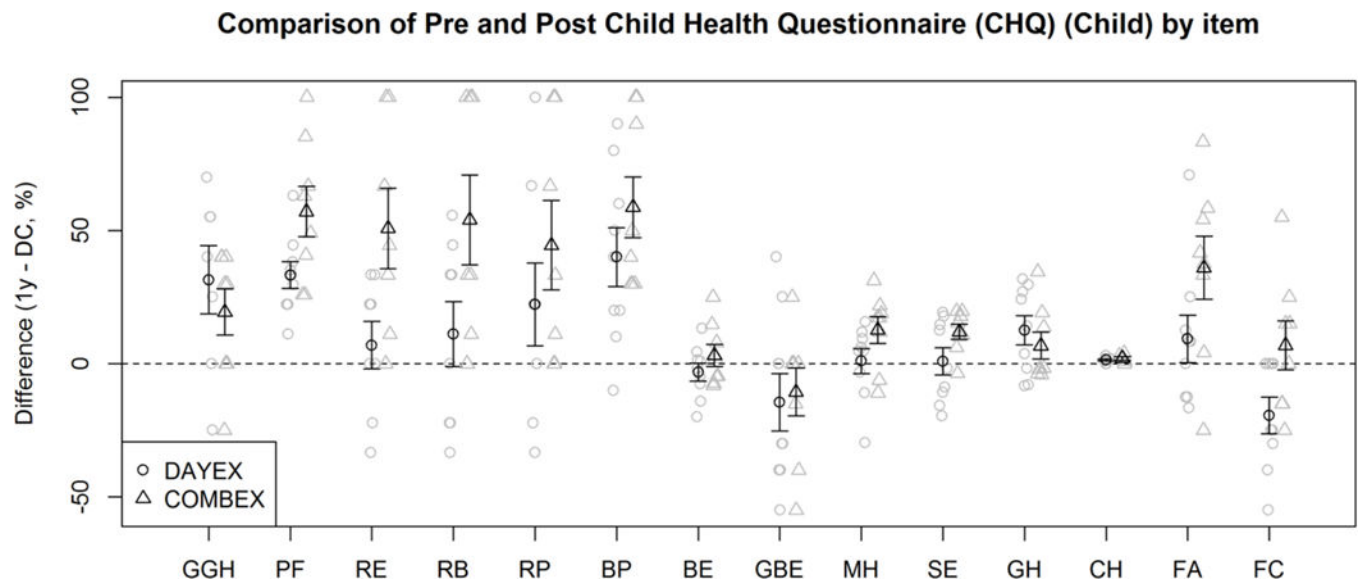


Figure 4.
Comparison of Pre and Post Child Health Questionnaire (Child)

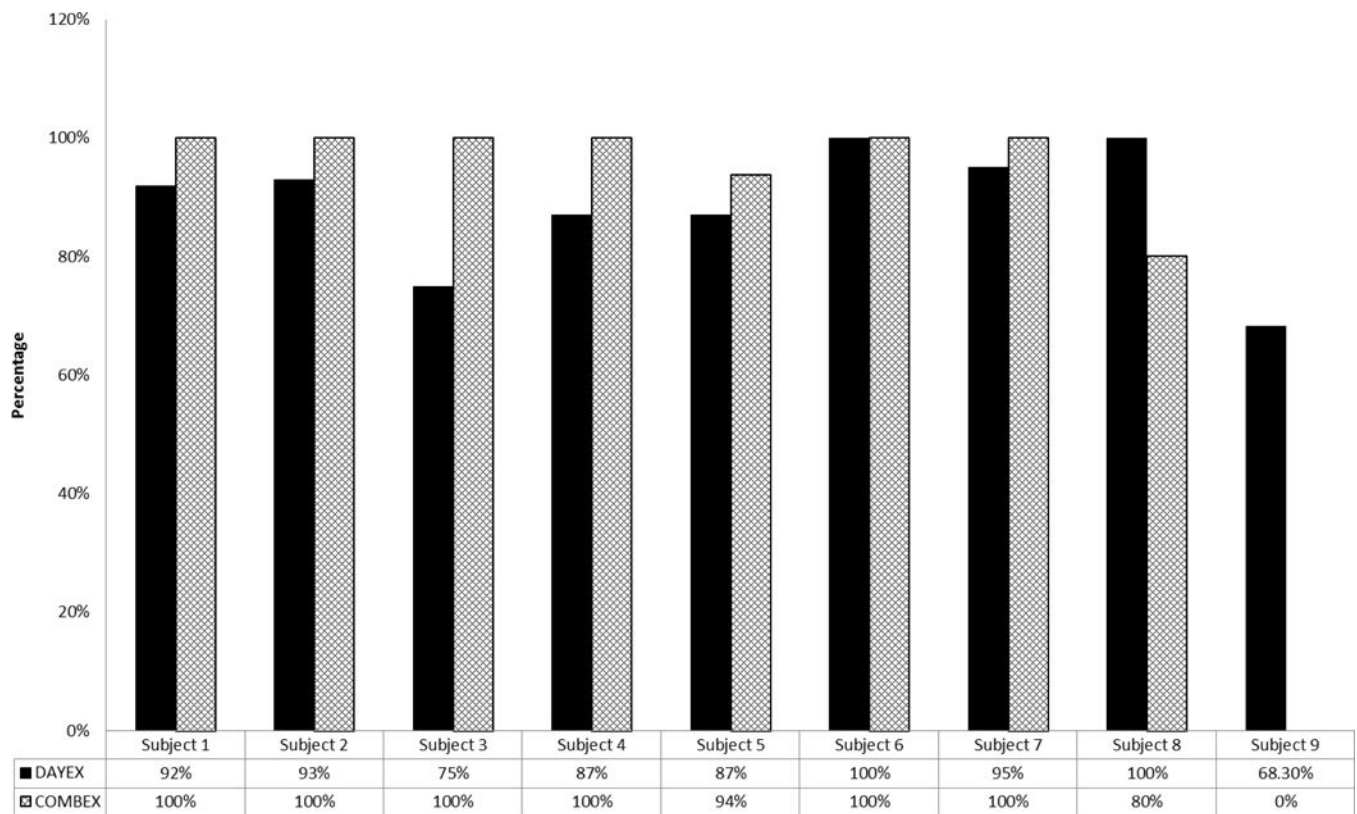


Figure 5. Percentage of Individual Exercise Compliance between the Groups

-Subject 9 in the COMBEX group had 0% compliance because the subject had to undergo multiple surgeries, stopped and started COMBEX (inconsistency) assisting the gym and non-compliance

-Subject 9 in the DAYEX group had 68.3% compliance because the subject was unable to keep wellness center appointments due to multiple surgeries.

Table 1

Demographics/Days between burn/Medication List/Exercise Compliance

	DAYEX Group	COMBEX Group	p-value
Demographics			
<i>n</i>	9	9	
Gender distribution	Males = 6/Females = 3	Males = 7/Females = 2	
Age at burn	14.4 ± 3.8	13.2 ± 2.9	0.45
TBSA%	60.7% ± 11.6%	57.3% ± 20.5%	0.68
TBSA 3rd %	44.1% ± 19.7%	49.2% ± 21.1%	0.60
Height (cm) D/C	155.0 ± 18.0	157.2 ± 13.5	0.77
Height (cm) 1 year	156.0 ± 15.6	159.2 ± 13.2	0.64
Weight (cm) D/C	47.8 ± 13.1	48.8 ± 11.7	0.87
Weight (cm) 1 year	54.4 ± 18.2	58.9 ± 17.0	0.61
Length of Hospital Stay (LOS)	32.6 ± 4.9	40.5 ± 34.2	0.0004 *
Days Between Burn			
Timepoint 1 – Pre Exercise	66.0 ± 17.1	55.0 ± 24.0	0.28
Timepoint 1 Range	42 – 94	21 – 93	
Timepoint 2 – Post Exercise	351.0 ± 53.0	344 ± 41.8	0.76
Timepoint 2 Range	269 – 431	272 – 397	
Difference	285 ± 51.0	289.1 ± 43.0	
Difference of Range	194 ± 350	208 ± 336	
Medication List			
No Medication	2 of 9 (22%)	3 of 9 (33%)	
Propranolol Alone	4 of 9 (44%)	3 of 9 (33%)	
Oxandrolone and Propranolol	2 of 9 (22%)	1 of 9 (11%)	
Metformin	1 of 9 (11%)	2 of 9 (22%)	
Compliance with Exercise	89.0% ± 16.8%	86.0% ± 71.0%	0.36

-Values are mean ± SD, TBSA (total body surface area), COMBEX (community-based exercise program), DAYEX (In-hospital exercise program), and TBSA (total body surface area burns)

-The two regimens in the medication list were not significantly different in supplemental medications

* Significance in the LOS was observed because 5 participants in the COMBEX group stayed in hospital for more than 45 days

Time point 1 = Before Exercise

Time point 2 = at 6 – 12 months post burn

Child Health Questionnaire – PF28 (Parent) Change (mean \pm SD) between discharge and 1 year post burn for DAYEX and COMBEX

Table 2

Scale Item Name and (Abbreviation)	DAYEX Change N=9	P-value	COMBEX Change N=9	P - value	Comparison of Change * P - value
	Mean \pm SD		Mean \pm SD		
Global Health (GGH)	15.0 \pm 25.5	NS	44.4 \pm 40.8	.034	NS
Physical Functioning (PF)	44.4 \pm 40.8	.034	59.3 \pm 27.2	.001	NS
Role/Social Limitations – Emotional (REB)	18.5 \pm 47.5	NS	51.9 \pm 50.3	.060	NS
Role/Social Limitations – Physical (RP)	29.6 \pm 35.1	NS	40.7 \pm 52.1	NS	NS
Bodily Pain/Discomfort (BP)	15.0 \pm 36.6	NS	55.6 \pm 29.6	.002	.080
Behavior (BE)	-8.8 \pm 17.7	NS	5.6 \pm 30.3	NS	NS
Global Behavior (GBE)	-6.7 \pm 29.6	NS	1.1 \pm 18.2	NS	NS
Mental Health (MH)	-6.0 \pm 16.5	NS	15.7 \pm 30.2	NS	NS
Self Esteem (SE)	13.0 \pm 31.2	NS	-1.9 \pm 14.3	NS	NS
General Health Perceptions (GH)	3.0 \pm 17.3	NS	1.1 \pm 23.5	NS	NS
Change in Health (CH)	1.6 \pm 1.1	.009	3.0 \pm 1.5	.003	.092
Parental Impact – Emotional (PE)	16.7 \pm 34.8	NS	30.6 \pm 33.1	.098	NS
Parental Impact – Time (PT)	-1.9 \pm 25.6	NS	14.8 \pm 45.2	NS	NS
Family Activities (FA)	0.0 \pm 51.5	NS	41.7 \pm 28.0	.008	NS
Family Cohesion (FC)	-13.3 \pm 16.4	NS	4.4 \pm 19.8	NS	NS

* Difference between the change in DAYEX and COMBEX

NS means non-significant number; p > .1

Table 3

Child Health Questionnaire - CF 87 (Child) Change (mean \pm SD) between discharge and 1 year post burn for DAYEX and COMBEX

Scale Item Name and (Abbreviation)	DAYEX Change N=9	P - value	COMBEX Change N=9	P - value	Comparison of Change *P - value
	Mean \pm SD		Mean \pm SD		
Global Health (GGH)	31.4 \pm 33.9	NS	19.4 \pm 24.6	NS	NS
Physical Functioning (PF)	33.2 \pm 14.9	.006	57.1 \pm 26.8	.002	.089
Role/Social Limitations – Emotional (RE)	6.9 \pm 25.2	NS	50.8 \pm 40.0	.061	.095
Role/Social Limitations – Behavioral (RB)	11.1 \pm 34.6	NS	54.0 \pm 44.6	.074	NS
Role/Social Limitations – Physical (RP)	22.2 \pm 44.0	NS	44.4 \pm 44.4	NS	NS
Bodily Pain/Discomfort (BP)	40.0 \pm 33.2	.020	58.8 \pm 32.3	.005	NS
Behavior (BE)	-3.2 \pm 10.0	NS	3.1 \pm 12.0	NS	NS
Global Behavior (GBE)	-14.4 \pm 32.4	NS	-10.6 \pm 25.6	NS	NS
Mental Health (MH)	1.0 \pm 13.9	NS	12.6 \pm 14.3	NS	NS
Self Esteem (SE)	0.8 \pm 15.3	NS	12.0 \pm 8.0	.015	NS
General Health Perceptions (GH)	12.5 \pm 16.4	NS	6.7 \pm 14.3	NS	NS
Change in Health (CH)	1.4 \pm 1.1	.032	2.0 \pm 1.6	NS	NS
Family Activities (FA)	9.3 \pm 26.8	NS	35.9 \pm 33.5	.076	NS
Family Cohesion (FC)	-19.4 \pm 20.5	.079	6.9 \pm 26.2	NS	NS

*** Difference between the change in DAYEX and COMBEX

NS means non-significant number; p > .1

Table 4

Example of exercise program in the hospital and in the Community

Phase	Frequency	Intensity	Time (Approximate Duration)	Type (Potential Activities)
Aerobic Training Phase	3 days a week	60 – 85% peak heart rate or Rate Perceived Exertion (RPE) of 6 – 8	20 – 40 minutes	Walking along designated with rest as needed, cycling and/or treadmill.
<i>Warm Up Phase</i>			10 minutes	Gentle stretches for all major muscle groups (neck, shoulders, arms, hamstrings, quadriceps, and calves); marching on the spot to increase heart rate.
<i>Cool Down Phase</i>			10 minutes	Gentle stretches for all major muscle groups (neck, shoulders, arms, hamstrings, quads, and calves); slow walking to decrease heart rate.
Resistive Exercise Training Phase	3 days a week	8–15 repetitions; 3 sets; 1 minute rest interval; maximum loads lifted 8–12 times	20 – 30 minutes	Functional exercises to promote strength. Bench press, bicep curls, tricep curls, lateral pull down, knee extension, hamstring curls, and abdominal curls.
<i>Warm up Phase</i>			10 minutes	Gentle stretches for all major muscle groups (neck, shoulders, arms, hamstrings, quadriceps, and calves); marching on the spot to increase heart rate.
<i>Cool Down Phase</i>			10 minutes	Gentle stretches for all major muscle groups (neck, shoulders, arms, hamstrings, quads, and calves); slow walking to decrease heart rate.

Table 5

DAYEX and COMBEX Gym and Transportation Expenses

	DAYEX (Shriners Hospitals for Children)	COMBEX (Gym near home)	
	<i>Estimated Cost for 3 months</i>	<i>Estimated Cost for 3 months</i>	
Range of Costs	US (Dollars) <i>US Citizen</i>	US (Dollars) <i>US Citizen</i>	MX (Pesos) <i>MX Citizen</i>
<i>Gym Enrollment Fee + Gym Membership</i>	~\$127.00	~\$400.00	~\$8,000.00
<i>Personal Training</i>	~\$63.00 per hour = ~\$2,268.00 for 36 sessions	~\$1,200.00	~\$10,000.00
<i>Transportation</i>	\$0.00	~\$300.00	~\$100.00
<i>Housing</i>	~\$1,350.00 (hospital owned apartments)	N/A	N/A
<i>Meals</i>	~\$900.00	N/A	N/A
TOTAL	~\$4,645.00	~\$1,900.00	~\$18,100.00

* The Ronald McDonald House of Galveston is a “home away from home” for families of children who are seeking medical treatment at the University of Texas Medical Branch, Shriners Hospitals for Children and Transitional Learning Center

** Patient covers meals for 10 days. If they stay more than 10 days then Shriners Hospital covers their cost for meals.

*** All medical expenses are covered by Medicaid and/or sponsorships Typical for Shriners Hospitals for Children-Galveston. Other non-Shriners hospitals typically do not have this model.

\$1.00 USD = \$18.00 MXN